

## Editorial

# A rehabilitative approach to patients with internal cardioverter-defibrillators

In the UK the National Institute for Clinical Excellence has recently reviewed the value of internal cardioverter-defibrillators (ICDs) and has recommended an increase in their use. The guidance includes the recommendation that centres that implant devices should provide “A rehabilitative approach to aftercare which includes psychological preparation for living with an ICD”.<sup>1</sup> The first solution that may occur to clinicians is to appoint a liaison nurse, but would this constitute a rehabilitative approach, or be the best solution for patients? We recently initiated a rehabilitation programme for ICD patients and, before doing so, reviewed the literature to answer two questions:

- What benefits could ICD patients hope to gain from rehabilitation?
- Do they have rehabilitation needs that differentiate them from other cardiac patients?

### What benefits could ICD patients receive from cardiac rehabilitation?

Systematic review and meta-analysis have established that a cardiac rehabilitation programme can improve survival, functional ability, and quality of life in post-myocardial infarction and cardiac surgery patients. It is not, as many think, simply an exercise programme. To be effective it must include attention to secondary prevention through lifestyle change, and attention to the patient’s psychological and social adjustment to coronary artery disease.<sup>2</sup>

#### SURVIVAL BENEFITS

It might be thought that ICD patients are protected from sudden death so have little to gain in this respect. Unfortunately arrhythmias remain the cause of death in 60% of these patients.<sup>3</sup> It is not clear how cardiac rehabilitation reduces mortality but, as it does not reduce the rate of reinfarction, it may be through protecting the ischaemic heart from arrhythmia and this may be due to exercise. Animal work has shown that exercise training reduces lethal arrhythmias, probably through a shift in the autonomic balance towards an increased vagal effect<sup>4</sup>; similar shifts have been demonstrated in exercised post-myocardial infarction patients.<sup>5</sup> Cardiac rehabilitation has also been shown to reduce the frequency of ischaemic episodes which may trigger arrhythmias. While the mechanism remains obscure it is clear that taking moderate levels of exercise is associated with a 70% reduction in the risk of sudden cardiac arrest (odds ratio 0.27, 95% confidence interval (CI) 0.11 to 0.67) after adjustment for the major coronary heart disease (CHD) risk factors,<sup>6</sup> and that cardiac rehabilitation has been shown to lead to patients adopting a more active lifestyle.<sup>2</sup>

It is also possible that the reduction in mortality results from the psychological elements of cardiac rehabilitation. Depression, social isolation, and stress are becoming increasingly well established as independent risk factors for sudden death in patients with CHD. A meta-analysis of psychological interventions that included more than 4000 cardiac patients yielded log adjusted odds ratios of 1.70 for

mortality (95% CI 1.09 to 2.64) and 1.84 for recurrence (95% CI 1.12 to 2.99) in controls.<sup>7</sup> In a study where arrhythmias were deliberately induced in ICD patients under one of two conditions—with or without a mental stressor—the addition of the stressor made it significantly harder to terminate the ventricular fibrillation, and all patients who produced an increase in noradrenaline (nor-epinephrine) of > 50% required a shock to correct ventricular tachycardia ( $p < 0.01$ ).<sup>8</sup> A number of studies have reported a positive relation between anxiety and the number of firings a patient experiences, but it has not been clear which was cause and which effect.<sup>9</sup> In a recent prospective study of 176 patients with ICDs in which psychological factors were sampled quarterly for a year, anxiety was a significant independent predictor of future arrhythmic events; however, the number of arrhythmic events did not predict the subsequent mood, suggesting that heightened anxiety may increase the occurrence of firings.<sup>10</sup>

#### QUALITY OF LIFE BENEFITS

It might be thought that an ICD would make patients less fearful than other cardiac patients. Although implantation relieves much of the fear of sudden death and is welcomed by patients, it also imposes new fears and has its own set of negative consequences so that the overall effect on psychological health is largely neutral.<sup>9</sup>

Compared to the general population, quality of life and psychological adjustment are poor in ICD patients. Approximately 30% of patients manifest clinically significant levels of anxiety or depression and are thus similar to patients with heart failure and angina.<sup>9</sup> Much of this distress is treatable and these patients should be referred to a psychologist or liaison psychiatrist with an interest in cardiac patients. A recent randomised controlled trial of cognitive behavioural therapy for ICD patients significantly reduced anxiety and depression.<sup>11</sup> Sexual problems are commonly reported, with 70% of patients reporting problems with sexual intercourse. How much of this is related to their disease and medical treatment and how much to anxiety is not known. Return to work is poor and often associated with “non-medical” factors.<sup>9</sup>

The partners of ICD patients show levels of distress similar to the patients. They report feelings of helplessness and uncertainty about what they should do if, or when, the device fires, and worry about the reliability of the ICD. They also worry about their own position should their partner die. It has been observed that family members often avoid expressing emotion for fear of precipitating a firing. Anxious partners commonly “overprotect” cardiac patients and our experience suggests that it may be a particularly severe problem in ICD partners. In our classes approximately 50% of partners spontaneously ask to attend with the patient, and in group discussion most agree that they intervene significantly to restrict their partners’ activities. This is particularly unhelpful as most patients are already too sedentary.

## FUNCTIONAL BENEFITS

Exercise programmes improve capacity and reduce symptoms in patients with heart failure and angina, and are regarded as safe for ICD patients.<sup>12</sup> In our experience ICD patients welcome the chance to take part in supervised exercise classes because many are aware that they are chronically unfit but are afraid to initiate exercise without professional guidance in case it leads to a firing. A gain in fitness does not automatically transfer to improved function in the activities of daily living. We also use “goal setting and pacing”, a technique we developed with angina patients to help them gradually return to activities (for example, walking, golf, gardening, home repairs) that they have abandoned.<sup>13</sup>

**Do ICD patients have different rehabilitation needs?**

Most of the problems discussed above are to be found in other patients with chronic cardiac conditions. The most potent source of distress that is unique to ICD patients is the effect of experiencing or anticipating a firing. A firing is usually highly aversive and accompanied by acute pain and anxiety. Many patients report a feeling of dread or helplessness that can persist for hours or even days after a firing.<sup>9</sup> A firing usually leads to a withdrawal of the patient's driving licence (for 12 months in the UK), and this can have a profound effect on a patient's quality of life including loss of income and increased dependence on others. Many patients say that this is what worries them most about experiencing a firing. The unpredictability of firings can produce, in some patients, an almost permanent state of anticipatory anxiety. Some may become reluctant to socialise or even become reclusive because of the social embarrassment a firing may cause.<sup>9</sup>

In a series of 213 ICD patients “illness appraisal” and “coping behaviours” were independent predictors of the patient's functional status.<sup>14</sup> Approximately 90% of patients attribute each firing to a specific antecedent cause. Attributions can include almost anything but are most commonly an activity such as walking, gardening, or bending over to paint, or are related to stress or excitement, such as watching a football match or worrying about something. Assigning a cause in this way can lead to an increasingly restricted and unsatisfying lifestyle as more and more activities are struck off the patients' repertoire by themselves or their spouse. This curtailment, if severe, can lead to physical deconditioning and an impoverished and depressing life, especially for the younger patients.

An important aspect of cardiac rehabilitation is education. Most ICD patients require education about heart disease and this should target the common “cardiac misconceptions” that can lead to poor adjustment. ICD patients have additional worries such as the battery going flat, electrical equipment triggering a “firing”, or electrocuting their partner should it fire during intercourse.

We have not been able to find a study of the cognitive status of ICD patients but our impression is that, compared with other groups of cardiac patients, memory and concentration problems are more common. It would be surprising if this were not the case as several studies have shown that 30% of patients who have survived an out of hospital cardiac arrest have “moderate to severe” cognitive deficits associated with global brain volume reduction.<sup>15</sup> The majority of ICD patients will have arrested and many will have had cardiac surgery which is also a risk factor for cognitive problems.

**Conclusions**

Patients with ICDs suffer similar levels of anxiety and depression, faulty health beliefs, sexual and relationship difficulties, and resort to the same unhelpful coping

strategies as other groups of patients with chronic symptomatic cardiac disease. The great majority have the same secondary prevention, lifestyle change, and educational needs. Patients with ICDs and their partners require additional educational sessions to help them express their worries about the device. As with other cardiac patients, partners should be included in the rehabilitation process and have their psychological needs addressed. The UK national service framework for CHD states that cardiac rehabilitation programmes should have staff skilled in supervising exercise and providing cognitive-behavioural treatments, and that appropriate psychological help should be available for anxious and depressed patients.<sup>16</sup> Therefore, theoretically, all of the skills required to help ICD patients should be available in any cardiac centre that has cardiac rehabilitation. In reality these resources are often inadequate. It would seem sensible for implantation teams to work with the cardiac rehabilitation team to ensure that these resources are made available and to share them, rather than to attempt to establish their own “rehabilitative approach”.

R J P LEWIN

*British Heart Foundation Rehabilitation Research Unit,  
The University of York,  
Genesis 6,  
York Science Park,  
Heslington,  
York YO10 5DG, UK  
rjpl1@york.ac.uk*

D J FRIZELLE

*Department of Clinical Psychology,  
University of Hull,  
Cottingham Road,  
Hull HU6 7RX, UK*

G C KAYE

*Department of Cardiology,  
Castle Hill Hospital,  
Castle Road,  
Cottingham,  
East Yorkshire HU16 5JQ, UK*

- National Institute for Clinical Excellence. *Guidance on the use of implantable cardioverter defibrillators for arrhythmias*. London: NICE, 2000.
- NHS Centre for Reviews and Dissemination. *Cardiac rehabilitation*. *Effective Health Care Bulletin* 1998;4:4. CRD, University of York.
- Pires LA, Lehmann MH, Streinman RT, et al. Sudden death in implantable cardioverter-defibrillator recipients: clinical context, arrhythmic events and device response. *J Am Coll Cardiol* 1999;33:24–32.
- Hull SS Jr, Vanoli E, Adamson PB, et al. Exercise training confers anticipatory protection from sudden death during acute myocardial ischaemia. *Circulation* 1994;89:548–52.
- Fujimoto S, Uemura S, Tomoda Y, et al. Effects of exercise training on the heart rate variability and QT dispersion of patients with acute myocardial infarction. *Jpn Circ J* 1999;63:577–82.
- Lemaitre RN, Siscovick DS, Raghunathan TE, et al. Leisure-time physical activity and the risk of primary cardiac arrest. *Arch Intern Med* 1999;159:686–90.
- Linden W, Stossel C, Maurice J. Psychosocial interventions for patients with coronary artery disease: a meta-analysis. *Arch Intern Med* 1996;156:745–52.
- Lampert R, Jain D, Burg MM, et al. Destabilizing effects of mental stress on ventricular arrhythmias in patients with implantable cardioverter-defibrillators. *Circulation* 2000;101:158–64.
- Sears SF Jr, Todaro JF, Lewis TS, et al. Examining the psychosocial impact of implantable cardioverter defibrillators: a literature review. *Clin Cardiol* 1999;22:481–9.
- Dunbar SB, Kimble LP, Jenkins LS, et al. Association of mood disturbance and arrhythmia events in patients after cardioverter defibrillator implantation. *Depress Anxiety* 1999;9:163–8.
- Kohn CS, Petrucci RJ, Baessler C, et al. The effect of psychological intervention on patients' long-term adjustment to the ICD: a prospective study. *Pacing Clin Electrophysiol* 2000;23:450–56.
- Lampman RM, Knight BP. Prescribing exercise training for patients with defibrillators. *Am J Phys Med Rehabil* 2000;79:292–7.
- Lewin B. The psychological and behavioural management of angina. *Journal of Psychosomatic Research* 1997;5:453–62.
- Burgess ES, Quigley JF, Moran G, et al. Predictors of psychosocial adjustment in patients with implantable cardioverter defibrillators. *Pacing Clin Electrophysiol* 1997;20:1790–5.
- Grubb NR, Fox KA, Smith K, et al. Memory impairment in out-of-hospital cardiac arrest survivors is associated with global reduction in brain volume, not focal hippocampal injury. *Stroke* 2000;31:1509–14.
- Department of Health. *The national service framework for coronary heart disease*. London: Department of Health, 2000.